**Tiling around a Fountain**

**SCENARIO:** You are working on a landscaping crew for the county parks department this summer. To avoid the mud that surrounded the park fountains last summer, your crew is planning to put a border of tiles around each of the square fountains in the park. The border tiles each measure 1-foot on each side. Your foreman shows you this diagram for the smallest fountain. You notice that a fountain that has a base of 1 square foot will require 8 border tiles.

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Using this pattern, how many tiles will be needed for different size square fountains?

**Problem 1:**

If a square fountain has sides of length s feet, how many tiles are needed to form the border?

* Using grid paper, draw a diagram of the designs for the border of fountains with side lengths of 2, 3, 4, 6 and 10 feet. Record your results in a table.
* Write an equation for the number of tiles, N, needed to form a border for a square fountain with side length of s feet.
* Generate as many equations as you can for this relationship.
* Are the equations the same? How can you convince someone that your expressions for the number of tiles needed are equivalent?

**Follow-up Problem:**

Make a table and a graph for each equation you found in problem 1.

* Do the tables and graphs show that the expressions and equations are equivalent?
* Is this relationship between **s** and **N** linear, quadratic, exponential, or none of these? How do you know? Explain why?